Form PTO-1390 (Rev. 12-29-99) US DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NO.
H 3734 PCT/US

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)
09/857078

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/09114	**November 25, 1999**	**December 4, 1998**

TITLE OF INVENTION
STEROL PHOSPHATES USED AS DEODORANT SUBSTANCES

APPLICANT(S) FOR DO/EO/US
Rafael PI SUBIRANA, Joaquin BIGORRA LLOSAS

Applicant herewith submits to the United States Designated/Elected Office (EO/DO/US) the following items and other information:

1. ■ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).
4. ■ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ■ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ■ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ■ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ■ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ■ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ■ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). **(UNEXECUTED)**
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ■ A FIRST preliminary amendment
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

"Express Mail Post Office to Addressee" service Mailing Label Number EL541613633US .

U.S. Application No. (if known, see 37 CFR 1.5) 09/857078	INTERNATIONAL APPLICATION NO. PCT/EP99/09114	ATTORNEY'S DOCKET NUMBER H 3734 PCT/US

17.■ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):

	CALCULATIONS	PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....**$1,000.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....**$860.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37CFR 1.445(a)(2)) paid to USPTO **$710.00**		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690.00**		
International preliminary examination fee paid to USPTO (37CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4).....**$100.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date 37 (CFR 1.492(e)).	$ 0	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	21 - 20 =	1	1 X $18.00	$ 18	
Independent Claims	4 - 3 =	1	1 X $80.00	$ 80	
Multiple dependent claims (s)(if applicable)		0	+ $270.00	$ 0	
TOTAL OF ABOVE CALCULATIONS =				$ 958	
Reduction of ½ for filing by small entity, if applicable. A Small Entity Statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				$ 0	
SUBTOTAL =				$ 958	
Processing fee of **$130.00** for furnishing the English translation later the ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$ 0	
TOTAL NATIONAL FEE =				$ 958	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$ 0	
TOTAL FEES ENCLOSED =				$ 958	
				Amount to be: refunded:	$----------
				charged:	$958.00

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ■ Please charge my Deposit Account No. 50-1177 in the amount of $958.00 to cover the above fees. A triplicate copy of this sheet is enclosed. Order No. 01-0324.

c. ■ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-1177. A triplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO: Cognis Corporation, Law Dept.
2500 Renaissance Blvd., Suite 200
Gulph Mills, PA 19406

SIGNATURE:

Aaron R. Ettelman
NAME ATTORNEY FOR APPLICANT

42,516
REGISTRATION NUMBER

"Express Mail " Mailing Label Number EL541613633US .

PATENT
Docket No. H 3734 PCT/US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

RE: PCT/EP99/09114
International Filing Date: November 25, 1999
Priority Date Claimed: December 4, 1998
Applicant: Pi Subirana, et al.
Title: STEROL PHOSPHATES USED AS DEODORANT SUBSTANCES
Applicants' Reference: H 3734 PCT/US

PRELIMINARY AMENDMENT

Commissioner for Patents
Box PCT
Washington, DC 20231

ATTN: DO/EO/US

Prior to the calculation of fees and examination of the above-identified national stage application pursuant to the accompanying submission under 35 U.S.C. §371, please amend the English translation of the International Application submitted herewith, without prejudice, as follows:

In the Specification:

Please amend the instant Specification, without prejudice, as follows:

Please delete all text above line 7 of page 1, including the heading "Prior Art", and replace the deleted matter with the following new section headings and title of the invention:

--TITLE OF THE INVENTION

Sterol Phosphates and Processes for Their Preparation,
Deodorant Compositions Containing the Same, and Methods of Using the Same

BACKGROUND OF THE INVENTION--

At page 2, line 4 thereof, please delete the section heading "Description of the

Invention" and insert the following new section heading and new paragraph:

--BRIEF SUMMARY OF THE INVENTION

The present invention relates, in general, to sterol phosphates, to a process for their production and to the use of sterol phosphates for the production of cosmetic preparations.--

At page 2, line 29 thereof, please insert the following new section heading:

--DETAILED DESCRIPTION OF THE INVENTION--

At page 20, between lines 1 and 2, please add the following new paragraph:

--What is claimed is:--.

On a separate, new page 22, following page 21, please add the following new section heading and paragraph containing an Abstract of the Disclosure:

--ABSTRACT OF THE DISCLOSURE

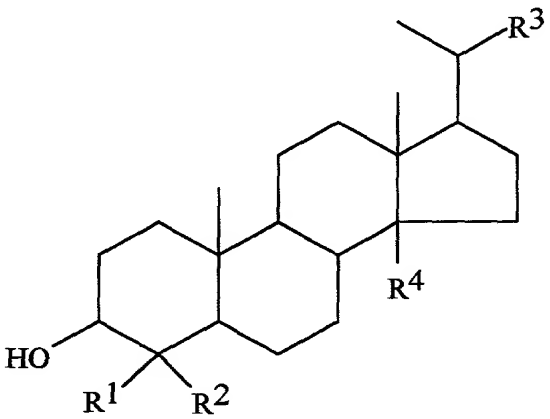
Sterol phosphates having deodorant and/or deodorant-enhancing properties are described. Processes for the preparation of said sterol phosphates wherein a sterol is reacted with polyphosphoric acid in a non-polar solvent are also described. Methods of deodorizing the human body and enhancing the deodorizing effect of compositions containing other active deodorizing agents are also described. --

In the Claims:

Please add new claims 10-30, as follows:

--10. (New) A process for the preparation of sterol phosphates, said process comprising:

(a) providing a sterol of the general formula (II), having a fused, four-ring steroidal nucleus;



(II)

wherein each of R^1, R^2 and R^4 independently represents a hydrogen atom or a methyl group and R^3 represents a linear or branched alk(en)yl group having from 1 to 15 carbon atoms, and wherein the fused, four-ring steroidal nucleus can contain one or more carbon-carbon double bonds; and

(b) reacting the sterol with polyphosphoric acid in a non-polar solvent.--

--11. (New) The process according to claim 10, further comprising at least partially hydrogenating the sterol prior to reacting the sterol with the polyphosphoric acid in the non-polar solvent.--

--12. (New) The process according to claim 10, further comprising completely hydrogenating the sterol prior to reacting the sterol with the polyphosphoric acid in the non-polar solvent.--

--13. (New) The process according to claim 10, wherein the reaction of the sterol with the polyphosphoric acid is carried out at a temperature of from 65°C to 95°C.--

--14. (New) The process according to claim 11, wherein the reaction of the

sterol with the polyphosphoric acid is carried out at a temperature of from 65°C to 95°C.--

--15. (New) The process according to claim 10, wherein the sterol comprises a phytosterol.--

--16. (New) The process according to claim 11, wherein the sterol comprises a phytosterol.--

--17. (New) The process according to claim 10, wherein the sterol comprises a soy-derived sterol compound.--

--18. (New) The process according to claim 10, wherein the non-polar solvent comprises heptane.--

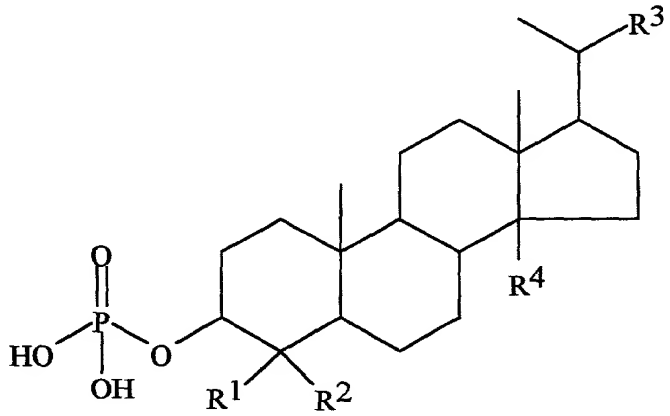
--19. (New) The process according to claim 11, wherein the non-polar solvent comprises heptane.--

--20. (New) The process according to claim 10, wherein the reaction of the sterol with the polyphosphoric acid is carried out at a temperature of from 65°C to 95°C; wherein the sterol comprises a soy-derived sterol compound; and wherein the non-polar solvent comprises heptane.--

--21. (New) A sterol phosphate prepared by the process according to claim 10.--

--22. (New) A sterol phosphate prepared by the process according to claim 20.--

--23. (New) A cosmetic preparation comprising a formulation base and a sterol phosphate of the general formula (I), having a fused, four-ring steroidal nucleus:



(I)

wherein each of R^1, R^2 and R^4 independently represents a hydrogen atom or a methyl group and R^3 represents a linear or branched alk(en)yl group having from 1 to 15 carbon atoms, and wherein the fused, four-ring steroidal nucleus can contain one or more carbon-carbon double bonds.--

--24. (New) The cosmetic preparation according to claim 23, wherein the sterol phosphate is present in an amount of from 0.1 to 1.0% by weight, based on the preparation.--

--25. (New) The cosmetic preparation according to claim 23, further comprising one or more deodorizing agents selected from the group consisting of aluminum chlorohydrates, esterase inhibitors, bactericidal agents, bacteriostatic agents, and mixtures thereof.--

--26. (New) The cosmetic preparation according to claim 23, further comprising an aluminum chlorohydrate, an esterase inhibitor and at least one bactericidal or bacteriostatic agent.--

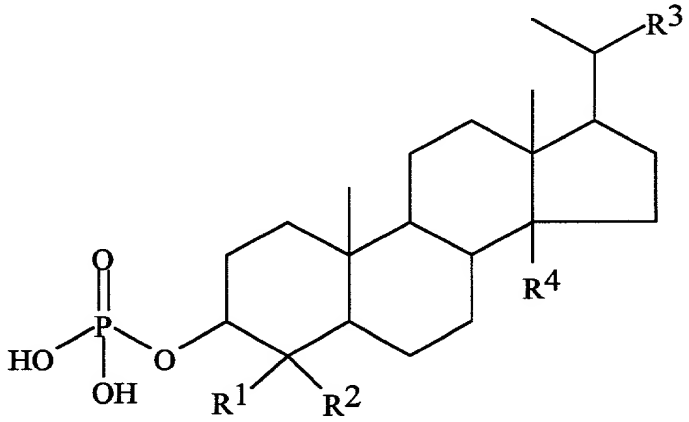
--27. (New) The cosmetic preparation according to claim 23, wherein the

sterol phosphate comprises a phytosterol-derived sterol phosphate.--

--28. (New) The cosmetic preparation according to claim 23, wherein the sterol phosphate comprises a soyasterol-derived sterol phosphate.--

--29. (New) A method of deodorizing the human body, said method comprising:

(a) providing a cosmetic preparation comprising a formulation base and a sterol phosphate of the general formula (I), having a fused, four-ring steroidal nucleus:



(I)

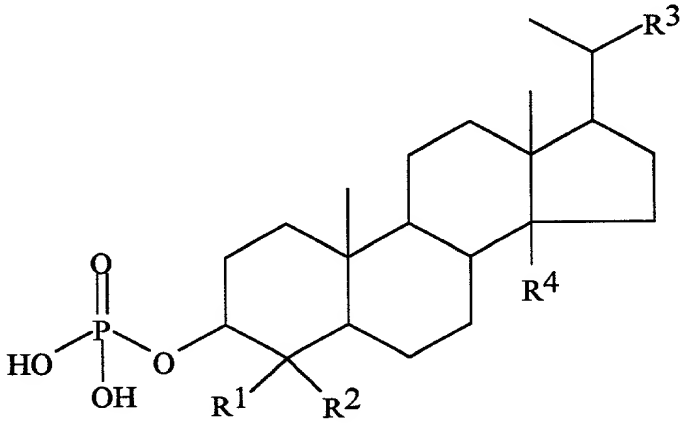
wherein each of R^1, R^2 and R^4 independently represents a hydrogen atom or a methyl group and R^3 represents a linear or branched alk(en)yl group having from 1 to 15 carbon atoms, and wherein the fused, four-ring steroidal nucleus can contain one or more carbon-carbon double bonds; and

(b) applying an odor-suppressing effective amount of the cosmetic preparation to an area of the body to be deodorized.--

--30. (New) A method of enhancing deodorizing effects of a cosmetic preparation, said method comprising:

(a) providing a cosmetic preparation containing at least one deodorizing agent;

(b) providing a sterol phosphate of the general formula (I), having a fused, four-ring steroidal nucleus:



(I)

wherein each of R^1, R^2 and R^4 independently represents a hydrogen atom or a methyl group and R^3 represents a linear or branched alk(en)yl group having from 1 to 15 carbon atoms, and wherein the fused, four-ring steroidal nucleus can contain one or more carbon-carbon double bonds; and

(c) combining the cosmetic preparation and a deodorant-enhancing effective amount of the sterol phosphate.--

Please cancel claims 1-9, without prejudice.

REMARKS

Claims 10-30 are currently pending in the instant application.

The Specification has been amended to delete the original section headings and to insert the preferred section headings pursuant to 37 C.F.R. §1.77. A new Title of the Invention has been inserted. An Abstract of the Disclosure, in accordance with the disclosure, has been added. It is submitted that the amendments to the Specification made herein introduce no new matter. All of the amendments to the Specification constitute deletions of original section headings and/or paragraphs, and insertions or additions of new section headings and/or paragraphs. Accordingly, pursuant to 37 C.F.R. §1.121(b)(1)(iii), no separate page captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE" is necessary. A separate page containing a clean copy of the Abstract of the Disclosure has been attached for the Examiner's convenience. Entry of the amendments to the Specification made herein are therefore proper and respectfully requested.

Original claims 1-9 have been canceled and replaced with new claims 10-30 solely for the purpose of improving clarity and grammar, which may suffer in translation, and not for any reason which relates to the statutory requirements for a patent. New claims 10-30 have not been added in response to any rejection, nor in anticipation of any rejection. Applicants respectfully submit that the scope of new claims 10-30 generally corresponds to the scope of original claims 1-9, and that new claims 10-30 are no narrower than original claims 1-9. Furthermore, although a moot point in view of their cancellation, Applicants respectfully submit that original claims 1-9 satisfied the requirements of 35 U.S.C. §112, as filed. New claims 10-30 are supported by the claims as originally filed and in the Specification, for example, at page 2, lines 5-28; at page 2, line 31, through page 3, line 17; at page 18, lines 29-30; and in the Examples. No new matter has been introduced. All of the amendments to the Claims constitute cancellation of original claims and the addition of new claims. Accordingly, pursuant to 37 C.F.R. §1.121(c)(1)(ii), no separate page captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE" is necessary. Entry is therefore proper and respectfully requested.

Preliminary Amendment of U.S. National Stage for International Application PCT/EP99/09114 filed November 25, 1999

Prompt examination of the instant application in view of the amendments made herein is respectfully requested.

Respectfully submitted,

RAFAEL PI SUBIRANA, et al.

May 31, 2001
(Date)

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Sterol Phosphates used as Deodorant Substances

Field of the Invention

This invention relates to sterol phosphates, to a process for their production and to the use of sterol phosphates for the production of cosmetic preparations.

Prior Art

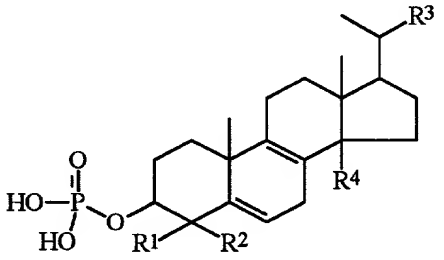
In the field of personal hygiene, deodorants are used to eliminate troublesome body odors. Body odors are formed by the bacterial decomposition of basically odorless perspiration, particularly in the damp underarm regions or under similar conditions favorable to microorganism growth. Body odors can be masked by suitable perfumes. They can also be controlled by using formulations which inhibit the actual secretion of perspiration or its decomposition (so-called antihydrotics, antiperspirants or antitranspirants). Typical examples of such substances are aluminium compounds, such as aluminium sulfate or aluminium chlorohydrate, zinc salts and citric acid compounds. An overview of these agents was published, for example, in **Umbach (Ed.), "Kosmetik", pages 141 et seq., Thieme Verlag, Stuttgart, 1988**.

However, it is clear from everyday living that the problem of odor inhibition, particularly in heat or in the event of bodily activity, has by no means been completely solved. Commercial products are unable permanently to suppress the secretion of perspiration or the formation of odors. Instead, their inhibiting effect is of limited duration and is also dependent on the extent to which perspiration is secreted. Accordingly, there is a constant need for improved products which minimize the secretion of perspiration and reduce the formation of body odors and which, at the same time, show increased dermatological compatibility, i.e.

reduced irritation potential towards particularly sensitive skin. The problem addressed by the present invention was to provide such products.

Description of the Invention

The present invention relates to sterol phosphates corresponding to formula **(I)**:



(I)

in which R^1, R^2 and R^4 independently of one another represent H and/or methyl and R^3 represents linear and/or branched alkyl and/or alkenyl groups containing 1 to 15 carbon atoms,
and hydrogenation products thereof. The present invention also relates to a process for the production of sterol phosphates corresponding to formula (I) in which the corresponding sterols, optionally after complete or partial hydrogenation, are reacted with polyphosphoric acid in nonpolar solvents.

It has surprisingly been found that sterol phosphates inhibit the activity of esterolytic enzymes, even in the lower ppm range, and that a synergistic deodorizing effect is obtained together with a number of active deodorizing principles. The sterol phosphates act selectively on serine esterases and serine proteases without impairing the biological equilibrium of the skin flora. At the same time, the use of sterol phosphates leads to an improvement in the dermatological compatibility of the products.

Sterol phosphates

Sterol phosphates are prepared by phosphation of sterols with

polyphosphoric acid in a nonpolar solvent, for example pentane, hexane, octane, dioxane, diethyl ether, tetrahydrofuran and particularly heptane, at temperatures of 65 to 95°C. Sterols – which may be used as starting materials for the production of sterol phosphates – are understood to be steroids which contain only a hydroxyl group but no other functional groups at C-3. Formally, therefore, they are alcohols which would explain why this group of compounds is sometimes also referred to as sterols. Generally, sterols contain 27 to 40 carbon atoms and one double bond in the 5/6 position and optionally in the 7/8, 8/9 or other positions. Besides these unsaturated species, however, other suitable starting materials are the partly saturated or saturated compounds obtainable by complete or partial hydrogenation. Typical examples of suitable sterol phosphates are those based on zoosterols, for example animal cholesterol, lanosterols from wool fat, spongosterols from sponges or stellasterols from starfish. However, phytosterol phosphates, for example those based on ergosterols, campesterols, stigmasterols and sitosterols, are preferably used by virtue of the lighter color of the phosphation products.

Commercial Applications

Sterol phosphates have proved to be enzyme-inhibiting for the described application. Accordingly, the present invention also relates to their use for the production of cosmetic preparations such as, for example, hair shampoos, hair lotions, foam baths, creams, gels or lotions.

In particular, they may be used for the production of deodorizing preparations either on their own or in the form of mixtures with other deodorizing agents, such as aluminium chlorohydrates, other esterase inhibitors and/or bactericidal or bacteriostatic agents.

To enable the active substances to be applied to the skin in a measurable, economic, convenient and cosmetically attractive manner, they are normally incorporated in formulation bases. The most important of

these include alcoholic and aqueous/alcoholic solutions, emulsions, gels, oils, wax/fat compounds, stick preparations and powders. Thus, the preparations according to the invention may contain, for example, up to 60% by weight of lower aliphatic alcohols, preferably ethanol, and organic acids, for example glycolic acid. Other ingredients include superfatting agents, emulsifiers, antioxidants, talcum, silica (for example as a support for the aluminium chlorohydrate), perfume oils, essential oils, dyes and - for spray applications - propellent gases such as, for example, propane and/or butane. The preparations are preferably marketed as rollers (roll-on emulsions), sticks, deodorant or pump sprays.

The cosmetic preparations may additionally contain mild surfactants, oil components, pearlizing waxes, consistency factors, thickeners, polymers, silicone compounds, fats, waxes, stabilizers, biogenic agents, anti-dandruff agents, film-formers, swelling agents, UV protection fractors, hydrotropes, preservatives, insect repellents, self-tanning agents, solubilizers, germ inhibitors and the like as further auxiliaries and additives.

Other auxiliaries and additives

Typical examples of suitable mild, i.e. dermatologically compatible, **surfactants** are fatty alcohol polyglycol ether sulfates, monoglyceride sulfates, mono- and/or dialkylsulfosuccinates, fatty acid isethionates, fatty acid sarcosinates, fatty acid taurides, fatty acid glutamates, ether carboxylic acids, alkyl oligoglucosides, fatty acid glucamides, alkyl amidobetaines and/or protein fatty acid condensates (preferably based on wheat proteins).

Suitable **oil components** are, for example, Guerbet alcohols based on fatty alcohols containing 6 to 18 and preferably 8 to 10 carbon atoms, esters of linear C_{6-22} fatty acids with linear C_{6-22} fatty alcohols, esters of branched C_{6-13} carboxylic acids with linear C_{6-22} fatty alcohols, esters of linear C_{6-22} fatty acids with branched alcohols, more particularly 2-ethyl hexanol, esters of hydroxycarboxylic acids with linear or branched C_{6-22}

fatty alcohols, more particularly dioctyl malate, esters of linear and/or branched fatty acids with polyhydric alcohols (for example propylene glycol, dimer diol or trimer triol) and/or Guerbet alcohols, triglycerides based on C_{6-10} fatty acids, liquid mono-/di-/triglyceride mixtures based on C_{6-18} fatty acids, esters of C_{6-22} fatty alcohols and/or Guerbet alcohols with aromatic carboxylic acids, more particularly benzoic acid, esters of C_{2-12} dicarboxylic acids with linear or branched alcohols containing 1 to 22 carbon atoms or polyols containing 2 to 10 carbon atoms and 2 to 6 hydroxyl groups, vegetable oils, branched primary alcohols, substituted cyclohexanes, linear and branched C_{6-22} fatty alcohol carbonates, Guerbet carbonates, esters of benzoic acid with linear and/or branched C_{6-22} alcohols (for example Finsolv® TN), linear or branched, symmetrical or nonsymmetrical dialkyl ethers containing 6 to 22 carbon atoms per alkyl group, ring opening products of epoxidized fatty acid esters with polyols, silicone oils and/or aliphatic or naphthenic hydrocarbons.

Suitable **emulsifiers** are, for example, nonionic surfactants from at least one of the following groups:

(1) products of the addition of 2 to 30 moles of ethylene oxide and/or 0 to 5 moles of propylene oxide onto linear fatty alcohols containing 8 to 22 carbon atoms, onto fatty acids containing 12 to 22 carbon atoms and onto alkylphenols containing 8 to 15 carbon atoms in the alkyl group;

(2) $C_{12/18}$ fatty acid monoesters and diesters of addition products of 1 to 30 moles of ethylene oxide onto glycerol;

(3) glycerol monoesters and diesters and sorbitan monoesters and diesters of saturated and unsaturated fatty acids containing 6 to 22 carbon atoms and ethylene oxide adducts thereof;

(4) alkyl mono- and oligoglycosides containing 8 to 22 carbon atoms in the alkyl group and ethoxylated analogs thereof;

(5) adducts of 15 to 60 moles of ethylene oxide with castor oil and/or hydrogenated castor oil;

(6) polyol esters and, in particular, polyglycerol esters such as, for example, polyglycerol polyricinoleate, polyglycerol poly-12-hydroxysterate or polyglyerol dimerate isostearate. Mixtures of compounds from several of these classes are also suitable;

(7) products of the addition of 2 to 15 moles of ethylene oxide onto castor oil and/or hydrogenated castor oil;

(8) partial esters based on linear, branched, unsaturated or saturated $C_{6/22}$ fatty acids, ricinoleic acid and 12-hydroxystearic acid and glycerol, polyglycerol, pentaerythritol, dipentaerythritol, sugar alcohols (for example sorbitol), alkyl glucosides (for example methyl glucoside, butyl glucoside, lauryl glucoside) and polyglucosides (for example cellulose);

(9) mono-, di- and trialkyl phosphates and mono-, di- and/or tri-PEG-alkyl phosphates and salts thereof;

(10) wool wax alcohols;

(11) polysiloxane/polyalkyl polyether copolymers and corresponding derivatives;

(12) mixed esters of pentaerythritol, fatty acids, citric acid and fatty alcohol according to **DE 11 65 574 PS** and/or mixed esters of fatty acids containing 6 to 22 carbon atoms, methyl glucose and polyols, preferably glycerol or polyglycerol;

(13) polyalkylene glycols and

(14) glycerol carbonate.

Products of the addition of ethylene oxide and/or propylene oxide onto fatty alcohols, fatty acids, alkylphenols, glycerol monoesters and diesters and sorbitan monoesters and diesters of fatty acids or onto castor oil are known commercially available products. They are homolog mixtures

of which the average degree of alkoxylation corresponds to the ratio between the quantities of ethylene oxide and/or propylene oxide and substrate with which the addition reaction is carried out. $C_{12/18}$ fatty acid monoesters and diesters of adducts of ethylene oxide with glycerol are known as refatting agents for cosmetic compositions from **DE 20 24 051 PS**.

$C_{8/18}$ alkyl mono- and oligoglycosides, their production and their use are known from the prior art. They are produced in particular by reacting glucose or oligosaccharides with primary alcohols containing 8 to 18 carbon atoms. So far as the glycoside component is concerned, both monoglycosides where a cyclic sugar unit is attached to the fatty alcohol by a glycoside bond and oligomeric glycosides with a degree of oligomerization of preferably up to about 8 are suitable. The degree of oligomerization is a statistical mean value on which a homolog distribution typical of such technical products is based.

In addition, zwitterionic surfactants may be used as emulsifiers. Zwitterionic surfactants are surface-active compounds which contain at least one quaternary ammonium group and at least one carboxylate and one sulfonate group in the molecule. Particularly suitable zwitterionic surfactants are the so-called betaines, such as the N-alkyl-N,N-dimethyl ammonium glycinates, for example cocoalkyl dimethyl ammonium glycinate, N-acylaminopropyl-N,N-dimethyl ammonium glycinates, for example cocoacylaminopropyl dimethyl ammonium glycinate, and 2-alkyl-3-carboxymethyl-3-hydroxyethyl imidazolines containing 8 to 18 carbon atoms in the alkyl or acyl group and cocoacylaminoethyl hydroxyethyl carboxymethyl glycinate. The fatty acid amide derivative known under the CTFA name of *Cocoamidopropyl Betaine* is particularly preferred. Ampholytic surfactants are also suitable emulsifiers. Ampholytic surfactants are surface-active compounds which, in addition to a $C_{8/18}$ alkyl or acyl group, contain at least one free amino group and at least one -COOH-

or -SO_3H- group in the molecule and which are capable of forming inner salts. Examples of suitable ampholytic surfactants are N-alkyl glycines, N-alkyl propionic acids, N-alkylaminobutyric acids, N-alkyliminodipropionic acids, N-hydroxyethyl-N-alkylamidopropyl glycines, N-alkyl taurines, N-alkyl sarcosines, 2-alkylaminopropionic acids and alkylaminoacetic acids containing around 8 to 18 carbon atoms in the alkyl group. Particularly preferred ampholytic surfactants are N-cocoalkylaminopropionate, cocoacylaminoethyl aminopropionate and $C_{12/18}$ acyl sarcosine. Besides ampholytic emulsifiers, quaternary emulsifiers may also be used, those of the esterquat type, preferably methyl-quaternized difatty acid triethanolamine ester salts, being particularly preferred.

Superfatting agents may be selected from such substances as, for example, lanolin and lecithin and also polyethoxylated or acylated lanolin and lecithin derivatives, polyol fatty acid esters, monoglycerides and fatty acid alkanolamides, the fatty acid alkanolamides also serving as foam stabilizers.

Suitable **pearlizing waxes** are, for example, alkylene glycol esters, especially ethylene glycol distearate; fatty acid alkanolamides, especially cocofatty acid diethanolamide; partial glycerides, especially stearic acid monoglyceride; esters of polybasic, optionally hydroxysubstituted carboxylic acids with fatty alcohols containing 6 to 22 carbon atoms, especially long-chain esters of tartaric acid; fatty compounds, such as for example fatty alcohols, fatty ketones, fatty aldehydes, fatty ethers and fatty carbonates which contain in all at least 24 carbon atoms, especially laurone and distearylether; fatty acids, such as stearic acid, hydroxystearic acid or behenic acid, ring opening products of olefin epoxides containing 12 to 22 carbon atoms with fatty alcohols containing 12 to 22 carbon atoms and/or polyols containing 2 to 15 carbon atoms and 2 to 10 hydroxyl groups and mixtures thereof.

The **consistency factors** mainly used are fatty alcohols or

hydroxyfatty alcohols containing 12 to 22 and preferably 16 to 18 carbon atoms and also partial glycerides, fatty acids or hydroxyfatty acids. A combination of these substances with alkyl oligoglucosides and/or fatty acid N-methyl glucamides of the same chain length and/or polyglycerol poly-12-hydroxystearates is preferably used. Suitable **thickeners** are, for example, polysaccharides, more especially xanthan gum, guar-guar, agar-agar, alginates and tyloses, carboxymethyl cellulose and hydroxyethyl cellulose, also relatively high molecular weight polyethylene glycol monoesters and diesters of fatty acids, polyacrylates (for example Carbopols® [Goodrich] or Synthalens® [Sigma]), polyacrylamides, polyvinyl alcohol and polyvinyl pyrrolidone, surfactants such as, for example, ethoxylated fatty acid glycerides, esters of fatty acids with polyols, for example pentaerythritol or trimethylol propane, narrow-range fatty alcohol ethoxylates or alkyl oligoglucosides and electrolytes, such as sodium chloride and ammonium chloride.

Suitable **cationic polymers** are, for example, cationic cellulose derivatives such as, for example, the quaternized hydroxyethyl cellulose obtainable from Amerchol under the name of Polymer JR 400®, cationic starch, copolymers of diallyl ammonium salts and acrylamides, quaternized vinyl pyrrolidone/vinyl imidazole polymers such as, for example, Luviquat® (BASF), condensation products of polyglycols and amines, quaternized collagen polypeptides such as, for example, Lauryldimonium Hydroxypropyl Hydrolyzed Collagen (Lamequat® L, Grünau GmbH), quaternized wheat polypeptides, polyethyleneimine, cationic silicone polymers such as, for example, amodimethicone, copolymers of adipic acid and dimethylamino-hydroxypropyl diethylenetriamine (Cartaretine®, Sandoz AG), copolymers of acrylic acid with dimethyl diallyl ammonium chloride (Merquat® 550, Chemviron), polyaminopolyamides as described, for example, in **FR 2 252 840 A** and crosslinked water-soluble polymers thereof, cationic chitin derivatives such as, for example, quaternized chitosan, optionally in micro-

crystalline distribution, condensation products of dihaloalkyls, for example dibromobutane, with bis-dialkylamines, for example bis-dimethylamino-1,3-propane, cationic guar gum such as, for example, Jaguar®CBS, Jaguar®C-17, Jaguar®C-16 of Celanese, USA, quaternized ammonium salt polymers such as, for example, Mirapol® A-15, Mirapol® AD-1, Mirapol® AZ-1 of Miranol, USA.

Suitable **anionic, zwitterionic, amphoteric and nonionic polymers** are, for example, vinyl acetate/crotonic acid copolymers, vinyl pyrrolidone/vinyl acrylate copolymers, vinyl acetate/butyl maleate/isobornyl acrylate copolymers, methyl vinylether/maleic anhydride copolymers and esters thereof, uncrosslinked and polyol-crosslinked polyacrylic acids, acrylamidopropyl trimethylammonium chloride/acrylate copolymers, octylacrylamide/methyl methacrylate/tert.-butylaminoethyl methacrylate/2-hydroxypropyl methacrylate copolymers, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, vinyl pyrrolidone/dimethylaminoethyl methacrylate/vinyl caprolactam terpolymers and optionally derivatized cellulose ethers and silicones.

Suitable **silicone compounds** are, for example, dimethyl polysiloxanes, methylphenyl polysiloxanes, cyclic silicones and amino-, fatty acid-, alcohol-, polyether-, epoxy-, fluorine-, glycoside- and/or alkyl-modified silicone compounds which may be both liquid and resin-like at room temperature. In addition, a detailed review of suitable liquid silicones was published by Todd et al. in **Cosm. Toil. 91, 27 (1976).**

Typical examples of **fats** are glycerides while suitable **waxes** are inter alia beeswax, carnauba wax, candelilla wax, montan wax, paraffin wax, hydrogenated castor oils, fatty acid esters solid at room temperature or microwaxes, optionally in combination with hydrophilic waxes, for example cetyl stearyl alcohol or partial glycerides. Metal salts of fatty acids such as, for example, magnesium, aluminium and/or zinc stearate or ricinoleate may be used as **stabilizers**.

In the context of the invention, **biogenic agents** are, for example, tocopherol, tocopherol acetate, tocopherol palmitate, ascorbic acid, deoxyribonucleic acid, retinol, bisabolol, allantoin, phytantriol, panthenol, AHA acids, amino acids, ceramides, pseudoceramides, essential oils, plant extracts, and vitamin complexes.

Suitable **antidandruff agents** are climbazol, octopirox and zinc pyrithione. Standard **film formers** are, for example, chitosan, microcrystalline chitosan, quaternized chitosan, polyvinyl pyrrolidone, vinyl pyrrolidone/vinyl acetate copolymers, polymers of the acrylic acid series, quaternary cellulose derivatives, collagen, hyaluronic acid and salts thereof and similar compounds. Suitable **swelling agents** for aqueous phases are montmorillonites, clay minerals, Pemulen and alkyl-modified Carbopol types (Goodrich). Other suitable polymers and swelling agents can be found in R. Lochhead's review in **Cosm. Toil. 108, 95 (1993)**.

Examples of **UV protection factors** include organic substances (light filters) which are liquid or crystalline at room temperature and which are capable of absorbing ultraviolet radiation and of releasing the energy absorbed in the form of longer-wave radiation, for example heat. UV-B filters can be oil-soluble or water-soluble. The following are examples of oil-soluble substances:

- 3-benzylidene camphor or 3-benzylidene norcamphor and derivatives thereof, for example 3-(4-methylbenzylidene)-camphor, as described in **EP 0693471 B1**;
- 4-aminobenzoic acid derivatives, preferably 4-(dimethylamino)-benzoic acid-2-ethylhexyl ester, 4-(dimethylamino)-benzoic acid-2-octyl ester and 4-(dimethylamino)-benzoic acid amyl ester;
- esters of cinnamic acid, preferably 4-methoxycinnamic acid-2-ethylhexyl ester, 4-methoxycinnamic acid propyl ester, 4-methoxycinnamic acid isoamyl ester, 2-cyano-3,3-phenylcinnamic

acid-2-ethylhexyl ester (Octocrylene);

- esters of salicylic acid, preferably salicylic acid-2-ethylhexyl ester, salicylic acid-4-isopropylbenzyl ester, salicylic acid homomenthyl ester;
- derivatives of benzophenone, preferably 2-hydroxy-4-methoxybenzophenone, 2-hydroxy-4-methoxy-4'-methylbenzophenone, 2,2'-dihydroxy-4-methoxybenzophenone;
- esters of benzalmalonic acid, preferably 4-methoxybenzalmalonic acid di-2-ethylhexyl ester;
- triazine derivatives such as, for example, 2,4,6-trianilino-(p-carbo-2'-ethyl-1'-hexyloxy)-1,3,5-triazine and Octyl Triazone, as described in **EP 0 818 450 A1**;
- propane-1,3-diones such as, for example, 1-(4-tert.butylphenyl)-3-(4'-methoxyphenyl)-propane-1,3-dione;
- ketotricyclo(5.2.1)decane derivatives, as described in **EP 0 694 521 B1**.

Suitable water-soluble substances are

- 2-phenylbenzimidazole-5-sulfonic acid and alkali metal, alkaline earth metal, ammonium, alkylammonium, alkanolammonium and glucammonium salts thereof;
- sulfonic acid derivatives of benzophenones, preferably 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid and salts thereof;
- sulfonic acid derivatives of 3-benzylidene camphor such as, for example, 4-(2-oxo-3-bornylidenemethyl)-benzene sulfonic acid and 2-methyl-5-(2-oxo-3-bornylidene)-sulfonic acid and salts thereof.

Typical UV-A filters are, in particular, derivatives of benzoyl methane such as, for example 1-(4'-tert.butylphenyl)-3-(4'-methoxyphenyl)-propane-

1,3-dione, 4-tert-butyl-4'-methoxydibenzoylmethane (Parsol 1789) or 1-phenyl-3-(4'-isopropylphenyl)-propane-1,3-dione. The UV-A and UV-B filters may of course also be used in the form of mixtures. Besides the soluble substances mentioned, insoluble pigments, i.e. finely dispersed metal oxides or salts, may also be used for this purpose. Examples of suitable metal oxides are, in particular, zinc oxide and titanium dioxide and also oxides of iron, zirconium, silicon, manganese, aluminium and cerium and mixtures thereof. Silicates (talcum), barium sulfate and zinc stearate may be used as salts. The oxides and salts are used in the form of the pigments for skin-care and skin-protecting emulsions and decorative cosmetics. The particles should have an average diameter of less than 100 nm, preferably from 5 to 50 nm and more preferably from 15 to 30 nm. They may be spherical in shape although ellipsoidal particles or other non-spherical particles may also be used. So-called micro- or nanopigments are preferably used in sun protection products. Micronized zinc oxide is preferably used.

Other suitable UV filters can be found in P. Finkel's review in **SÖFW-Journal 122, 543 (1996)**.

Besides the two above-mentioned groups of primary protection factors, secondary protection factors of the **antioxidant** type may also be used. Secondary sun protection factors of the antioxidant type interrupt the photochemical reaction chain which is initiated when UV rays penetrate into the skin. Typical examples of suitable antioxidants are amino acids (for example glycine, histidine, tyrosine, tryptophane) and derivatives thereof, imidazoles (for example urocanic acid) and derivatives thereof, peptides, such as D,L-carnosine, D-carnosine, L-carnosine and derivatives thereof (for example anserine), carotinoids, carotenes (for example α-carotene, β-carotene, lycopene) and derivatives thereof, chlorogenic acid and derivatives thereof, liponic acid and derivatives thereof (for example dihydroliponic acid), aurothioglucose, propylthiouracil and other thiols (for

example thioredoxine, glutathione, cysteine, cystine, cystamine and glycosyl, N-acetyl, methyl, ethyl, propyl, amyl, butyl and lauryl, palmitoyl, oleyl, γ-linoleyl, cholesteryl and glyceryl esters thereof) and their salts, dilaurylthiodipropionate, distearylthiodipropionate, thiodipropionic acid and derivatives thereof (esters, ethers, peptides, lipids, nucleotides, nucleosides and salts) and sulfoximine compounds (for example butionine sulfoximines, homocysteine sulfoximine, butionine sulfones, penta-, hexa- and hepta-thionine sulfoximine) in very small compatible dosages (for example pmole to μmole/kg), also (metal) chelators (for example α-hydroxyfatty acids, palmitic acid, phytic acid, lactoferrine), α-hydroxy acids (for example citric acid, lactic acid, malic acid), humic acid, bile acid, bile extracts, bilirubin, biliverdin, EDTA, EGTA and derivatives thereof, unsaturated fatty acids and derivatives thereof (for example γ-linolenic acid, linoleic acid, oleic acid), folic acid and derivatives thereof, ubiquinone and ubiquinol and derivatives thereof, vitamin C and derivatives thereof (for example ascorbyl palmitate, Mg ascorbyl phosphate, ascorbyl acetate), tocopherols and derivatives (for example vitamin E acetate), vitamin A and derivatives (vitamin A palmitate) and coniferyl benzoate of benzoin resin, rutinic acid and derivatives thereof, α-glycosyl rutin, ferulic acid, furfurylidene glucitol, carnosine, butyl hydroxytoluene, butyl hydroxyanisole, nordihydroguaiac resin acid, nordihydroguaiaretic acid, trihydroxy-butyrophenone, uric acid and derivatives thereof, mannose and derivatives thereof, Superoxid-Dismutase, zinc and derivatives thereof (for example ZnO, $ZnSO_4$), selenium and derivatives thereof (for example selenium methionine), stilbenes and derivatives thereof (for example stilbene oxide, trans-stilbene oxide) and derivatives of these active substances suitable for the purposes of the invention (salts, esters, ethers, sugars, nucleotides, nucleosides, peptides and lipids).

In addition, **hydrotropes**, for example ethanol, isopropyl alcohol or polyols, may be used to improve flow behavior. Suitable polyols preferably

contain 2 to 15 carbon atoms and at least two hydroxyl groups. Typical examples are

- glycerol;
- alkylene glycols such as, for example, ethylene glycol, diethylene glycol, propylene glycol, butylene glycol, hexylene glycol and poly-ethylene glycols with an average molecular weight of 100 to 1000 dalton;
- technical oligoglycerol mixtures with a degree of self-condensation of 1.5 to 10 such as, for example, technical diglycerol mixtures with a diglycerol content of 40 to 50% by weight;
- methylol compounds such as, in particular, trimethylol ethane, trimethylol propane, trimethylol butane, pentaerythritol and dipentaerythritol;
- lower alkyl glucosides, particularly those containing 1 to 8 carbon atoms in the alkyl group, for example methyl and butyl glucoside;
- sugar alcohols containing 5 to 12 carbon atoms, for example sorbitol or mannitol,
- sugars containing 5 to 12 carbon atoms, for example glucose or sucrose;
- amino sugars, for example glucamine;

Suitable other **deodorizers** are, for example, antiperspirants, such as aluminium chlorhydrates. These antiperspirants are colorless hygroscopic crystals which readily deliquesce in air and which accumulate when aqueous aluminium chloride solutions are concentrated by evaporation. Aluminium chlorhydrate is used for the production of perspiration-inhibiting and deodorizing compositions and probably acts by partially blocking the sweat glands through the precipitation of proteins

and/or polysaccharides [cf. **J. Soc. Cosm. Chem. 24, 281 (1973)**]. For example, an aluminium chlorhydrate which corresponds to the formula $[Al_2(OH)_5Cl]\bullet 2.5H_2O$ and which is particularly preferred for the purposes of the invention is commercially available under the name of Locron® from Hoechst AG of Frankfurt, FRG [cf. **J. Pharm. Pharmcol. 26, 531 (1975)**]. Besides the chlorhydrates, aluminium hydroxylactates and acidic aluminium/zirconium salts may also be used. Other suitable deodorizers are esterase inhibitors, preferably trialkyl citrates, such as trimethyl citrate, tripropyl citrate, triisopropyl citrate, tributyl citrate and, in particular, triethyl citrate (Hydagen® CAT, Henkel KGaA, Düsseldorf, FRG). Esterase inhibitors inhibit enzyme activity and thus reduce odor formation. The free acid is probably released through the cleavage of the citric acid ester, reducing the pH value of the skin to such an extent that the enzymes are inhibited. Other esterase inhibitors are dicarboxylic acids and esters thereof, for example glutaric acid, glutaric acid monoethyl ester, glutaric acid diethyl ester, adipic acid, adipic acid monoethyl ester, adipic acid diethyl ester, malonic acid and malonic acid diethyl ester, hydroxycarboxylic acids and esters thereof, for example citric acid, malic acid, tartaric acid or tartaric acid diethyl ester. Antibacterial agents which influence the germ flora and destroy or inhibit the growth of perspiration-decomposing bacteria, may also be present in stick products. Examples of such antibacterial agents are chitosan, phenoxyethanol and chlorhexidine gluconate. 5-Chloro-2-(2,4-dichlorophenoxy)-phenol, which is marketed under the name of Irgasan® by Ciba-Geigy of Basel, Switzerland, has also proved to be particularly effective.

Suitable **preservatives** are, for example, phenoxyethanol, formaldehyde solution, parabens, pentanediol or sorbic acid and the other classes of compounds listed in Appendix 6, Parts A and B of the Kosmetikverordnung ("Cosmetics Directive"). Suitable **insect repellents** are N,N-diethyl-m-toluamide, pentane-1,2-diol or Insect Repellent 3535. A

suitable **self-tanning agent** is dihydroxyacetone.

Suitable **perfume oils** are mixtures of natural and synthetic fragrances. Natural fragrances include the extracts of blossoms (lily, lavender, rose, jasmine, neroli, ylang-ylang), stems and leaves (geranium, patchouli, petitgrain), fruits (anise, coriander, caraway, juniper), fruit peel (bergamot, lemon, orange), roots (nutmeg, angelica, celery, cardamon, costus, iris, calmus), woods (pinewood, sandalwood, guaiac wood, cedarwood, rosewood), herbs and grasses (tarragon, lemon grass, sage, thyme), needles and branches (spruce, fir, pine, dwarf pine), resins and balsams (galbanum, elemi, benzoin, myrrh, olibanum, opoponax). Animal raw materials, for example civet and beaver, may also be used. Typical synthetic perfume compounds are products of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Examples of perfume compounds of the ester type are benzyl acetate, phenoxyethyl isobutyrate, p-tert.butyl cyclohexylacetate, linalyl acetate, dimethyl benzyl carbinyl acetate, phenyl ethyl acetate, linalyl benzoate, benzyl formate, ethylmethyl phenyl glycinate, allyl cyclohexyl propionate, styrallyl propionate and benzyl salicylate. Ethers include, for example, benzyl ethyl ether while aldehydes include, for example, the linear alkanals containing 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxycitronellal, lilial and bourgeonal. Examples of suitable ketones are the ionones, α-isomethylionone and methyl cedryl ketone. Suitable alcohols are anethol, citronellol, eugenol, isoeugenol, geraniol, linalool, phenylethyl alcohol and terpineol. The hydrocarbons mainly include the terpenes and balsams. However, it is preferred to use mixtures of different perfume compounds which, together, produce an agreeable fragrance. Other suitable perfume oils are essential oils of relatively low volatility which are mostly used as aroma components. Examples are sage oil, camomile oil, clove oil, melissa oil, mint oil, cinnamon leaf oil, lime-blossom oil, juniper berry oil, vetiver oil, olibanum oil, galbanum oil, labolanum oil

and lavendin oil. The following are preferably used either individually or in the form of mixtures: bergamot oil, dihydromyrcenol, lilial, lyral, citronellol, phenylethyl alcohol, α-hexylcinnamaldehyde, geraniol, benzyl acetone, cyclamen aldehyde, linalool, Boisambrene Forte, Ambroxan, indole, hedione, sandelice, citrus oil, mandarin oil, orange oil, allylamyl glycolate, cyclovertal, lavendin oil, clary oil, β-damascone, geranium oil bourbon, cyclohexyl salicylate, Vertofix Coeur, Iso-E-Super, Fixolide NP, evernyl, iraldein gamma, phenylacetic acid, geranyl acetate, benzyl acetate, rose oxide, romillat, irotyl and floramat.

Suitable **dyes** are any of the substances suitable and approved for cosmetic purposes as listed, for example, in the publication **"Kosmetische Färbemittel"** of the **Farbstoffkommission der Deutschen Forschungsgemeinschaft, Verlag Chemie, Weinheim, 1984, pages 81 to 106.** These dyes are normally used in concentrations of 0.001 to 0.1% by weight, based on the mixture as a whole.

Typical examples of **germ inhibitors** are preservatives which act specifically against gram-positive bacteria such as, for example, 2,4,4'-trichloro-2'-hydroxydiphenyl ether, chlorhexidine (1,6-di-(4-chlorophenyl-biguanido)-hexane) or TCC (3,4,4'-trichlorocarbanilide). Numerous perfumes and essential oils also have antimicrobial properties. Typical examples are the active substances eugenol, menthol and thymol in clove, mint and thyme oil. An interesting natural deodorant is the terpene alcohol farnesol (3,7,11-trimethyl-2,6,10-dodecatrien-1-ol) which is present in linden blossom oil and which smells of lily-of-the-valley. Glycerol monolaurate has also been successfully used as a bacteriostatic agent. The percentage content of the additional germ-inhibiting agents is normally about 0.1 to 2% by weight, based on the solids component of the preparations.

The sterol phosphates may be used in quantities of 0.1 to 1.0% by weight, based on the final concentration.

Examples

General procedure

200 g of sterol were dissolved in 400 ml of a nonpolar solvent at 85 to 90°C and 58 g (corresponding to a 4.5-fold molar excess) of polyphosphoric acid were added to the resulting solution over a period of 15 minutes at a temperature of 70 to 75°C. The mixture was then heated under reflux for 3.5 hours at 80°C. After cooling, the reaction mixture was filtered and washed with 200 ml of isopropyl alcohol. The product was then dissolved in water at 80°C, stirred for about 1 hour at that temperature, re-filtered and then dried in vacuo at a low temperature.

The Examples are summarized in Table 1.

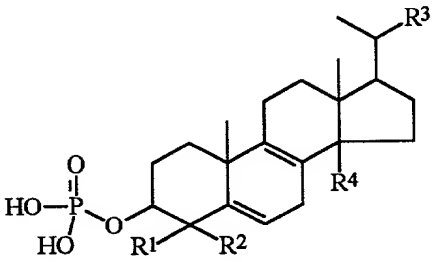
Table 1 - Examples 1 to 6:

Examples	Sterol	Solvents	Percentage contents (% of theoretical)
1	Soya sterol[1)]	n-Heptane	95
2	Lanosterols	n-Pentane	93
3	Cholesterols	n-Hexane	92
4	Campesterols	Diethyl ether	94
5	Stigmasterols	1,3-Dioxane	93
6	Sitosterols	Tetrahydrofuran	94

1) Generol® 122 N (Henkel Corp.)

CLAIMS

1. Sterol phosphates corresponding to formula **(I)**:

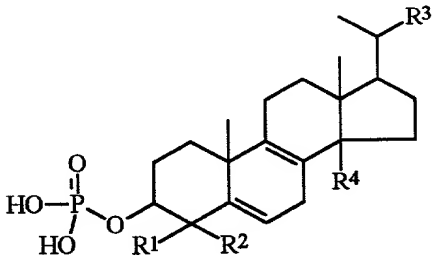


(I)

in which R^1, R^2 and R^4 independently of one another represent H and/or methyl and R^3 represents linear and/or branched alkyl and/or alkenyl groups containing 1 to 15 carbon atoms,
and hydrogenation products thereof.

2. Sterol phosphates as claimed in claim 1, characterized in that they are derived from lanosterol, cholesterol, campestrol, stigmasterol and/or sitosterol.

3. A process for the production of sterol phosphates corresponding to formula **(I)**:



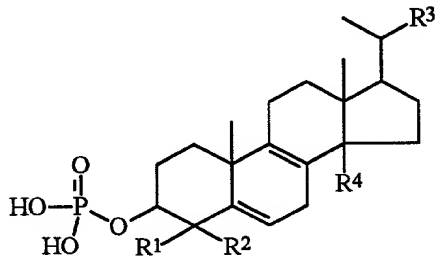
(I)

in which R^1, R^2 and R^4 independently of one another represent H and/or methyl and R^3 represents linear and/or branched alkyl and/or alkenyl groups containing 1 to 15 carbon atoms,
characterized in that, optionally after complete or partial hydrogenation, the corresponding sterols are reacted with polyphosphoric acid in nonpolar

solvents.

4. A process as claimed in claim 3, characterized in that the reaction is carried out at temperatures of 65 to 95°C.

5. The use of sterol phosphates corresponding to formula **(I)**:



(I)

in which R^1, R^2 and R^4 independently of one another represent H and/or methyl and R^3 represents linear and/or branched alkyl and/or alkenyl groups containing 1 to 15 carbon atoms,
and hydrogenation products thereof for the production of cosmetic preparations.

6. The use of sterol phosphates as claimed in claim 5 for the production of deodorizing preparations.

7. The use claimed in claims 5 and/or 6, characterized in that the sterol phosphates are used together with deodorizing agents.

8. The use claimed in at least one of claims 5 to 7, characterized in that the sterol phosphates are used together with aluminium chlorohydrate, esterase inhibitors and/or bactericdal or bacteriostatic agents.

9. The use claimed in at least one of claims 5 to 8, characterized in that the sterol phosphates are used in quantities of 0.1 to 1.0% by weight, based on the final concentration.

ABSTRACT OF THE DISCLOSURE

Sterol phosphates having deodorant and/or deodorant-enhancing properties are described. Processes for the preparation of said sterol phosphates wherein a sterol is reacted with polyphosphoric acid in a non-polar solvent are also described. Methods of deodorizing the human body and enhancing the deodorizing effect of compositions containing other active deodorizing agents are also described.

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

☐ Declaration Submitted with Initial Filing OR ☒ Declaration Submitted after Initial Filing

Attorney Docket Number	H 3734 PCT/US
First Named Inventor	PI SUBIRANA, Rafael
COMPLETE IF KNOWN	
Application Number	09/857,078
Filing Date	09/24/2001
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:
My residence, post office address, and citizenship are as stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

STEROL PHOSPHATES USED AS DEODORANT SUBSTANCES

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 11/25/1999 as United States Application Number or PCT International Application Number PCT/EP99/09114 and was amended on (MM/DD/YYYY) _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
198 55 956.9	DE	12/04/1998	☐	☐	☒

☐ Additional foreign application numbers are listed on a supplemental priority sheet attached hereto:

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

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DECLARATION

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code §112.1 acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number *(if applicable)*
	PCT/EP99/09114	11/25/1999	

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority sheet attached hereto.

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☐ Firm Name ____ Customer Number or label ____

OR

☒ List Attorney(s) and/or agent(s) name and registration number below:

Name	Registration Number	Name	Registration Number
John E. Drach	32,891	Aaron R. Ettelman	42,516
Steven J. Trzaska	36,296	Henry E. Millson, Jr.	18,980

☐ Additional attorney(s) and/or agent(s) named on a supplemental sheet attached hereto.

Please direct all correspondence to: ☒ Customer Number or label **23657** OR ☒ Fill in correspondence address below

Name	Aaron R. Ettelman				
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned

Given Name	**Rafael**	Middle Initial		Family Name	**PI SUBIRANA**	Suffix e.g. Jr.	
Inventor's Signature					Date	18.06.01	
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Applicant Authority							

☒ Additional inventors are being named on supplemental sheet(s) attached hereto

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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet

Name of Additional Joint Inventor, if any: ☐ A petition has been filed for this unsigned inventor

Given Name	Joaquin	Middle Initial		Family Name	BIGORRA LLOSAS	Suffix e.g. Jr.	
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Name of Additional Joint Inventor, if any: ☐ A petition has been filed for this unsigned inventor

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Name of Additional Joint Inventor, if any: ☐ A petition has been filed for this unsigned inventor

Given Name		Middle Initial		Family Name		Suffix e.g. Jr.	
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Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State	Zip	Country		Applicant Authority	

Name of Additional Joint Inventor, if any: ☐ A petition has been filed for this unsigned inventor

Given Name		Middle Initial		Family Name		Suffix e.g. Jr.	
Inventor's Signature						Date	
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State	Zip	Country		Applicant Authority	

☐ Additional inventors are being named on supplemental sheet(s) attached hereto